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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/KR99/00050 (22) International Filing Date: 1 February 1999 (01.02.99) (30) Priority Data: 1998/63927 30 December 1998 (30.12.98) KR (71)(72) Applicants and Inventors: CHOI, Sang-Gu [KR/KR]; 509-1102, Daedong, Town Ja-Dong, 1288, Haeundae-Gu, Pusan 612-030 (KR). KIM, Jong-Ung [KR/KR]; 605-7 Jungbu Dong Yangsan, Kyungnam 626-050 (KR). (74) Agent: KIM, Young, Ok; 1242-7, Yeonsan 5-Dong, Yeonje-ku, Pusan 611-085 (KR).	(81) Designated States: AT, AU, BG, BR, CA, CH, CN, CU, CZ, DE, DK, ES, FI, GB, HU, ID, IL, IS, JP, KP, KZ, LK, LU, MN, MX, NO, NZ, PL, PT, RO, RU, SE, SG, SK, TR, US, UZ, VN, YU, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  Published <i>With international search report.</i>	
(54) Title: A TOBACCO ADDED LOESS AND ITS MANUFACTURING METHOD (57) Abstract <p>The present invention is directed to manufacture a tobacco added loess which relieve the harm of smoking to human body by removing the poisonous chemicals in tobacco. Particularly, not only oxide compounds in the constituents of loess but also the iron oxides as additives react to the monoxide in tobacco smoke, whereby the concentration of monoxide is decreased remarkably. For the health of smokers or nonsmokers exposed to the tobacco smoke, the harmful chemicals in the smoke are easily and safely reduced by the chemical reactions and the molecular sieve effect of loess. The main embodiment of the present invention is directed to manufacture a tobacco added loess and iron oxide chemicals (Fe<sub>2</sub>O<sub>3</sub>, FeO) as additive if necessary. The dried fine loess under the particle size of 250 mesh or the diluted loess under the particle size of mesh 250 blend with the tobacco leaves, paper and filter so that the mixed tobacco materials introduce the appropriate stage for the manufacturing process of the various tobacco materials added loess and iron oxide chemicals (Fe<sub>2</sub>O<sub>3</sub>, FeO) as additive if necessary, in order to make loess as a vital ingredient of tobacco materials, diluting, extracting, dehydrating, grinding, purifying, immersing and blending process are essential embodiments of the present invention.</p>		

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## A tobacco added loess and its manufacturing method

### Technical field

The present invention relates to tobacco added loess as a  
5 ingredient, and particularly manufacturing methods for the tobacco  
that the concentrations of harmful chemicals in the tobacco smo  
are decreased by the reactions with the elements of loess.

### Background Art

10 According to a scientific report on the tobacco smoke,  
contains more than 3,800 chemicals, many of them are poisonou  
Among them 43 chemicals that are known to cause cance  
Especially, carbon monoxide in the smoke is an odourless, colourle  
and poisonous gas. Carbon monoxide interferes with the uptake  
15 oxygen in the lungs and with its release from the blood to the tissue  
that need it.

When carbon monoxide is inhaled, it combines wit  
hemoglobin in the blood. It reduces the amount of oxygen availab  
to the body's vital organs. In heavy smokers, carbon monoxide ca  
20 severely reduce the amount of oxygen carried by the blood. Oxyge  
levels may be reduced by as much as 15 percent.

Most smokers acknowledge the harm of tobacco but hard  
stop the smoking by oneself because of the addiction. For th  
reason, merchandise related to nonsmoking aids such as tobacc  
25 pipes, nicotine removers... and chewing gums are actively investigat  
for the health of smoker. But unfortunately most of nonsmoking ai  
are ineffective because they can not prevent the poisonous chemica  
of smoke in a primary way.

For the foregoing reasons, there is a need for a tobacco s  
30 that the harmful chemicals in the smoke are easily and safely reduce  
for the health of smokers or nonsmokers exposed to the tobacc  
smoke.

### Disclosure of Invention

35 The present invention is directed to manufacturing a tobacc

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added loess that reduce the carbon monoxide in the tobacco smoke. Consequently, the reduction of the carbon monoxide content in the smoke and the adsorptions of harmful chemicals into the porous loess are achieved by manufacturing the loess as  
5 an ingredient of tobacco which is main embodiment of present invention.

Loess is well known as antitoxin material in the native medicine in Korea. Recently the efficacies of loess is widely acknowledged as a biomaterial. The application of this material covers the production  
10 related to beds, a cloths and especially constructing materials.

Loess consists 40-80% of Quartz, 10-20% of Mica and Feldspar, 5-35% of Carbonate Mineral and 2-5% of Silt. In formation, silt contains the heavy minerals such as Hornblende, Apatite, Biotite, Chlorite, Kyanite, Epidote, Garnet, Augite, Rutile, Sillimanite, Staurolite, Tourmaline, and Zircon. The chemical  
15 ingredient of the loess consists 50-60% of  $\text{SiO}_2$ , 8-12% of  $\text{Al}_2\text{O}_3$ , 2-4% of  $\text{Fe}_2\text{O}_3$ , 0.8-1.1% of  $\text{FeO}$ , 4-16% of  $\text{CaO}$ , 2-6% of  $\text{MgO}$ , 0.5% of  $\text{TiO}_2$  and  $\text{MnO}$ . Generally it has 10-15% of water content and 50-55% of the porosity having a decreasing value with the increasing  
20 water concentration. Applying these properties of loess to tobacco, new approach for making tobacco is achieved with the present embodiments.

Consequently, it is an object of the present invention to provide a tobacco which reduce the harmful chemicals in the smoke  
25 while the taste of tobacco is not changed. The active iron oxide ( $\text{Fe}_2\text{O}_3$ ,  $\text{FeO}$ ) of loess in the tobacco burning react with the carbon monoxide so that the content of CO is decreased resulting increase of  $\text{CO}_2$  while in the smoking.

Another object of the present invention is to provide efficacies concerning the adsorbing operation on the harmful  
30 chemicals. The large porosity of loess adsorb the poisonous chemicals in the tobacco smoke. In the microscopic view, the contact between tobacco smoke and the refined loess in the fine mixture bring the adsorption of harmful chemicals into the porous loess so  
35 that the porous loess operate on harmful chemicals in smoke actively.

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as molecular sieves.

A further object of the present invention is directed to enhance innocuous content in the tobacco smoke. Not only the health for smoker but also for nonsmoker's exposed to the smoke should be protected in a primary way. The less out gas rate and content of CO with the ingredient help to diminish the harmful effect of the smoke.

Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter.

### Best Mode for Carrying out the Invention

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying processes and experiments which are given by way of illustrations.

In order to make loess as a useful ingredient of tobacco, the special treatments are necessary for the efficacies. The loess dilute by water is extracted by a sieve (Recommend under the size of mesh 250). The extracted loess is dehydrated using weak heat so that no chemical reaction occurs (Recommend to dry in the natural circumstance).

For making more fine ingredient, the dried loess is grinded under the particle size of 250 mesh. After grinding loess, a purifying process is required for removing the buoyant contaminations using a blow.

The tobacco leaves blend with the purified Loess having iron oxide chemicals as additives if necessary.

A soaking process of the blended tobacco leaves with the appropriate duration and temperature or a dehydrating process of the soaked tobacco leaves are also necessary for the manufacturing tobacco added loess.

Referring now in detail to the illustrating preferred embodiment of the present invention ;

#### **Illustration 1**

A tobacco added loess is fabricated according to following

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steps of;

- a) diluting loess using water;
- b) extracting the diluted loess using a sieve;
- c) dehydrating the minute loess using weak heat;
- 5 d) grinding the dried loess under the particle size of 25 mesh;
- e) purifying the fine loess using air blow;
- f) blending the refined loess having iron oxide chemicals a additive if necessary, with tobacco's leaves; and
- 10 g) introducing the blended tobacco's leaves in an appropriate stage for manufacturing the tobacco.

#### Illustration 2

A tobacco added loess is fabricated according to following steps of;

- 15 a) diluting loess using water;
- b) extracting the diluted loess in water using a sieve;
- c) dehydrating the minute loess using weak heat;
- d) grinding the dried loess under the particle size of 25 mesh;
- 20 e) purifying the fine loess using air blow;
- f) diluting the refined loess having iron oxide chemicals a additive if necessary, to an optimum concentration using water;
- g) immersing tobacco's leaves into the diluted loess;
- h) dehydrating the immersed tobacco's leaves; and
- 25 i) introducing the blended tobacco's leaves in an appropriate stage for manufacturing the tobacco.

#### Illustration 3

A tobacco paper added loess is fabricated according a recited in illustration 2 further including the steps of;

- 30 a) immersing the tobacco paper into the diluted loess havin iron oxide chemicals as additive if necessary;
- b) dehydrating the immersed tobacco paper; and
- c) introducing the processed tobacco paper in the appropriate stage for making the tobacco.

#### 35 Illustration 4

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A tobacco filter added loess is fabricated according as recite in illustration 2 further including the steps of;

- a) immersing the tobacco filter into the diluted loess having iron oxide chemicals as additive if necessary;
- 5        b) dehydrating the immersed tobacco filter; and
- c) introducing the processed tobacco filter in the appropriate stage for making the tobacco.

#### Illustration 5

A tobacco filter added loess is fabricated according to the following steps of;

- a) diluting loess using water;
- b) extracting the diluted loess using a sieve;
- c) dehydrating the minute loess using weak heat;
- 15       d) grinding the dried loess under the particle size of 25 mesh;
- e) purifying the fine loess using air blow;
- f) blending the purified loess with iron oxide chemicals as additive if necessary.
- g) introducing the processed loess powder in the appropriate stage for making the tobacco filter.
- 20       h) introducing the processed loess powder in the appropriate stage for making the tobacco filter.

#### Illustration 6

A tobacco, tobacco filter and tobacco paper only added iron oxides chemicals ( $\text{Fe}_2\text{O}_3$ ,  $\text{FeO}$ ).

To verify the efficacies, an experiment was carried out to investigate the concentration of CO in the tobacco smoke. The three kinds of tobacco are analyzed for the comparison. In this experiment the gas analyzer made by GASTECH is utilized for the detection. The followings are the detail results for the measurement.

#### Experiment 1 ;

30       The samples made by the present invention were detected for the carbon monoxide (CO) concentration in the tobacco smoke.

#### Result 1-1.

For the first time suction, the concentration of CO gas result 25ppm while the 2nd. times of suction reveal 100ppm. Accordingly the concentration is about 50ppm (100ppm/2times).

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Result 1-2.

For the first time suction, the concentration of CO gas result 30ppm while the 2nd. times of suction reveal 60ppm. Accordingly, the concentration is about 30ppm.

5 Result 1-3.

For the first time suction, the concentration of CO gas result 30ppm while the 2nd times of suction reveal 120ppm. Accordingly the concentration is about 60ppm.

Result 1-4.

10 For the first time suction, the concentration of CO gas result 25ppm while the 2nd. times of suction reveal 70ppm. Accordingly, the concentration is about 35ppm.

Result 1-5

15 For the first time suction, the concentration of CO gas result 20ppm while the 2nd. times of suction reveal 45ppm. Accordingly, the concentration is about 23ppm.

**Experiment 2 ;**

20 The samples of ordinary tobacco not added loess or iron oxides were detected for the carbon monoxide (CO) concentration the tobacco smoke.

Result 2-1

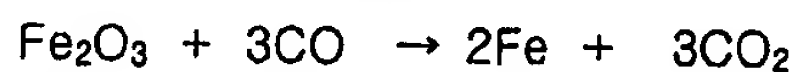
For the first time suction, the concentration of CO gas result 40ppm while the 2nd times of suction reveal over 500ppm. Accordingly, the concentration is over 250ppm.

25 Result 2-2

For the first time suction, the concentration of CO gas result 110ppm while the 2nd times of suction reveal over 500ppm. Accordingly, the concentration is over 250 ppm.

Result 2-3

30 For the first time suction, the concentration of CO gas result 190ppm while the 2nd times of suction reveal over 500ppm. Accordingly, the concentration is over 250ppm.

**Chemical formula 1**



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According to the experiment results, the concentration of CO containing in the ordinary tobacco smoke hold over 250 ppm. But the results according to the present invention of tobacco added loess show that the concentration indicate the values under 60ppm. As seen on the tangible results, the loess with the appropriate amount of iron oxides as a vital ingredient of tobacco operate the reduction for the CO concentration remarkably. While in the smoking, FeO, Fe<sub>2</sub>O<sub>3</sub>, CaO and MgO of loess are not stable compounds in the burning temperature of 900-1,000 celsius degree. Therefore the reactions between the carbon monoxide and oxides compounds in the loess conducts the reduction of carbon monoxide. The oxygen compounds in the loess or iron oxides (Fe<sub>2</sub>O<sub>3</sub>, FeO) inserted for the reinforcement easily react in the high temperature with the carbon monoxides providing the increase of carbon dioxides in the smoke as shown on the chemical formula 1.

#### Industrial Applicability

As illustrated in the above, the present invention is ve practical and useful in that the loess can reduce the harmful an poisonous smoke in a certain way. Therefore this invention decreas the pollution caused by the poisonous smoke of tobacco remarkab The chemicals in the tobacco smoke are known to cause headache nausea, vomiting, abdominal pain, diarrhoea, and cancer. Especial Carbon monoxide in tobacco smoke is an odorless, colourles poisonous gas. The decrease of carbon monoxide and toxic smok by the chemical reactions and the adsorption by the porous loes minimize the danger of poisonous effect of smoking. This prima protection from the harmful smoke is accomplished not only f smoker health but also for nonsmoker environment. These advantag strongly support the industrial applicability of the present invention.

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What Is Claimed Is

1. A method for manufacturing a tobacco added loess comprising the steps of:

- a) diluting loess using water;
- 5 b) extracting the diluted loess using a sieve;
- c) dehydrating the minute loess using weak heat;
- d) grinding the dried loess under the particle size of 250 mesh;
- e) purifying the fine loess using air blow;
- 10 f) blending the refined loess having iron oxide chemicals as additive if necessary, with tobacco's leaves; and
- g) introducing the blended tobacco's leaves in an appropriate stage for manufacturing the tobacco.

2. A method for manufacturing a tobacco added loess comprising the steps of:

- a) diluting loess using water;
- b) extracting the diluted loess in water using a sieve;
- c) dehydrating the minute loess using weak heat;
- d) grinding the dried loess under the particle size of 250 mesh;
- e) purifying the fine loess using air blow;
- f) diluting the refined loess having iron oxide chemicals as additive if necessary, to an optimum concentration using water;
- g) immersing tobacco's leaves into the diluted loess;
- 25 h) dehydrating the immersed tobacco's leaves; and
- i) introducing the blended tobacco's leaves in an appropriate stage for manufacturing the tobacco.

3. A method for manufacturing tobacco paper added loess as recited in claim 2 further including the steps of:

- 30 a) immersing the tobacco paper into the diluted loess having iron oxide chemicals as additive if necessary;
- b) dehydrating the immersed tobacco paper; and
- c) introducing the processed tobacco paper in the appropriate stage for making the tobacco.

35 4. A method for manufacturing tobacco filter added loess as

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recited in claim 2 further including the steps of;

a) immersing the tobacco filter into the diluted loess having iron oxide chemicals as additive if necessary;

b) dehydrating the immersed tobacco filter; and

5 c) introducing the processed tobacco filter in the appropriate stage for making the tobacco.

5. A method for manufacturing a tobacco filter comprising the steps of;

a) diluting loess using water;

10 b) extracting the diluted loess using a sieve;

c) dehydrating the minute loess using weak heat;

d) grinding the dried loess under the particle size of 250 mesh;

e) purifying the fine loess using air blow;

15 f) blending the purified loess with iron oxide chemicals as additive if necessary.

g) introducing the processed loess powder in the appropriate stage for making the tobacco filter.

20 6. A tobacco, tobacco filter and tobacco paper made according to the method of adding iron oxides chemicals ( $\text{Fe}_2\text{O}_3$ ,  $\text{FeO}$ ) as additives.

7. A tobacco added loess made according to the method of claim 1.

25 8. A tobacco added loess made according to the method of claim 2.

9. A tobacco paper added loess made according to the method of claim 3.

10. A tobacco filter added loess made according to the method of claim 4.

30 11. A tobacco filter added loess made according to the method of claim 5.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR 99/00050

## A. CLASSIFICATION OF SUBJECT MATTER

IPC<sup>7</sup>: A 24 B 15/28, A 24 D 1/02, 3/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC<sup>7</sup>: A 24 B; A 24 D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, PAJ, WPI, NPL

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 193 412 A (HEIM et al.), 18 March 1980 (18.03.80), claims.	1,2,4,5,7,8,10,11
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☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

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Date of the actual completion of the international search

05 August 1999 (05.08.99)

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Name and mailing address of the ISA/AT

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR 99/00050

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-5, 7-11: Specified methods for manufacturing a tobacco, tobacco paper or tobacco filter added loess.
2. Claim 6: A tobacco, tobacco filter and tobacco paper made according to the method of adding iron oxides.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:  
  
1-5 and 7-11
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR 99/00050

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